THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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SCIENCE AND PSEUDO SCIENCE

By Dr. Edwin E. Slosson.

Modern complex industrial life plunges everyone into a scientific environment so that no one can escape the deluge of scientific terms. But he may get them wrong. Each new discovery starts a parasitic growth of pseudo-science.

There is a north pole; but Cook didn't discover it.
There is magnetism; but not "animal magnetism".
There is wireless telegraphy; but that does not prove telepathy.
There are electrons; but "electronic" cures do not follow.

From miscellaneous reading in the papers the average layman gets a confused, composite, half digested impression to the effect that "Science Says":

People are descended from "monkeys"; the sun is made of radium; Mars is inhabited by a race of canal diggers; the ancient Mayas knew all about relativity; the earth is getting hotter; the earth is getting colder; the earth will be smashed up by running into a comet; the average mental age of Americans is thirteen; all progress comes from a superior Nordic race; mankind is losing all its teeth and hair; the world is going to starve to death from overpopulation; the world is going to die off from race suicide; Conan Doyle proved the existence of fairies; drinking sour milk or grafting goat glands will make everybody live to 150; there is no soul; everybody has two or three souls; according to Freud you must give rein to every impulse or die of a complex; all rheumatism comes from bad teeth; all diseases can be cured by manipulating the backbone; harnessing the power of the tides will replace coal as a source of power, etc., etc.

Some of these notions are false, some are hypotheses which may or may not be true, some are truths badly expressed or placed in a misleading context. The result is that the layman either becomes sceptical of all science or credulously falls victim to the first faker that can manipulate imposing catchwords.

Not only do new superstitions crop up from the soil fertilized by genuine discovery, but the old weeds still linger. Dream books, not only those based on Freud, but others of the old traditional sort, still sell in the shops. Fortune tellers manipulate packs of cards as well as Ouija boards. Astrology numbers more followers than lived in Egypt, Chaldea and Rome. We are only two hundred years removed from witch-burning forefathers, and some would do it yet if the law permitted. An excited fundamentalist in a Southern paper demands that all evolutionists be crucified head down.

This is not all cause for pessimism. At least it shows that science attracts

great interest and has vast prestige. "Imitation is the sincerest form of flattery." If fifty years ago legislatures did not persecute Darwinism it is because the average legislator had never heard of it. If people talk nonsense about Freudianism, hypnotism, Einstein, psychological tests, vitamins, and the like, at least they have heard of these things and want to hear more about them. All they need is some clue as to what things are so and what things are not.

Unfortunately those who trade on the name of science for profit, or who are fanatically sincere about some absurd theory, are better advertisers than the real scientists. They make more noise, assert themselves more dogmatically, make more sweeping claims and get attention first. They are not handicapped by the hesitations, uncertainties, shyness, professional caution of the true man of science. Reservations and qualifications make dull reading, and the necessary complexities of the scientific vocabulary frighten away the casual reader. Moreover, it is to be feared that some scientists are intellectual snobs and do not care whether the layman understands or not. They leave the field to pseudo-science without a struggle.

On the other hand, in the long run real science prevails over what the Bible terms "science falsely so-called" because it can prove itself by its works. "By their fruits ye shall know them", the experimental method. Only real chemistry can provide the basis for the big industrial inventions which the public demands and appreciates. Only real medicine can in the long run lower the municipal death rate.

There is another test of real science; its honesty. Fake science always tries to create mystery, to use long words for the purpose of creating confusion, to rely on occult forces and secret processes, because only so can it remain a profitable monopoly. Real science relies on tests and experiments that anyone can duplicate and does not add artificial difficulties to the real mysteries of nature. In a word, the real scientist and the faker are both talking to the layman in unknown tongues, but the real scientist is trying to make himself understood, the faker is trying to make himself misunderstood.

READING REFERENCE - The Development of the Sciences, lectures delivered at Yale University edited by Lorande Loss Woodruff. New Haven, Yale University Press, 1923.

Caldwell, Otis W. and Slosson, Edwin E. Science Remaking the World, New York, Doubleday, Page and Company, 1923.

LOST IN THE FOG

Children lost in London fogs have furnished the basis for many a story. Temporary separation from home and friends is, however, merely one of the minor tragedies shrouded in the murk, health statisticians have found. Recently it was discovered that the death rate from bronchitis and pneumonia increased sharply during the week following extra heavy fogs. Large quantities of unburnt coal from chimneys of factories and private residences, held in the atmosphere by the fog, are blamed for lowering the individual resistance to the disease germs, and so boosting the death rate.

ROCKET WILL EXPLORE INTERPLANETARY SPACE

A rocket that will travel from the earth to the moon in less than eleven hours may soon be a reality. Only one more step and such a rocket will invade the abysses of space and will make possible invaluable scientific data from the almost unknown region of the upper atmosphere. Prof. R. H. Goddard of Clark University, who has been carrying on investigations aimed at this result for the past 14 years, announced to the meeting of the American Association f r the Advancement of Science that he was now near his goal.

In his earlier experiments under the auspices of the Smithsonian Institution, Professor Goddard used smokeless powder as a propelling force, but he has recently solved the problem of utilizing liquid fuel, burning it continuously and gradually in pure oxygen without overheating the combustion chamber. By this means it is possible to give the rocket a speed of 6.6 miles a second. This is all that is necessary to carry it out of range of the force of the earth's gravitation, once free of which the rocket would proceed on indefinitely until it struck some heavenly body.

The average distance of the moon from the earth is close to 240,000 miles. A rocket travelling at a rate of six and six-tenths miles a second would traverse this distance in about ten hours and five minutes or about the time it takes mail planes to go from New York to Chicago.

A Roumanian professor, H. Oberth, in a paper published recently, suggests the possibility of some such over-night limited service to the moon; but Professor Goddard has only in mind the more modest and practicable plan of obtaining records of the intensity of the sun's radiation, and of the composition, electrical conditions, and temperature of the atmosphere at heights hitherto entirely inaccessible to man.

Dr. W. J. Humphreys, professor of meteorological physics in the U.S. Weather Bureau and an authority on the earth's atmosphere, said in commenting to Science Service on Professor Goddard's scheme:

"It would be a great advantage to the meteorologist to know the composition and temperature of the upper atmosphere at heights above those already explored by sounding balloons. On both these points observations and theories based upon meteors and auroras are in radical conflict with each other and both differ entirely from the hitherto recognized orthodox theories. The Goddard rocket gives promise of definitely settling the question of conditions at such high altitudes. It would be possible to construct apparatus that would bring down samples of the air at any desired height and at the same time register temperature and pressure without using the delicate and expensive recording instruments now employed."

Knowledge of the upper atmosphere has come mostly in recent years from the use of sounding balloons. These are about three feet in diameter and carry up a set of recording instruments which come down fastened to a parachute after the balloon bursts. None of these balloons has reached a height much greater than 20 miles, while the Goddard rocket can easily go three or four times as high or even be driven off into space. Its location at a given point in its flight can be made known by an explosion of flashlight powder.

There is great diversity of scientific opinion as to conditions existing in

the upper atmosphere. Some think it contains frozen crystals of nitrogen floating in a temperature of 513 below zero Fahrenheit or lower, while others believe that the temperature is not lower than about 60 below zero.

The velocity of the Goddard rocket, which is propelled on the same principle as the familiar Fourth-of-July firework, depends on the velocity of the gases expelled, and on its altitude. It starts slowly and increases in speed as long as the fuel lasts for several reasons. It encounters less resistence in the thin upper atmosphere or the near vacuum of interstellar space, it carries less weight as its fuel is used, and it becomes less and less affected by the force of the earth's attraction which decreases in proportion to the square of the distance from its center of gravity.

ACTIVE PRINCIPLE OF PITUITARY GLAND FOUND

The active principle of the pituitary gland has at last been isolated and purified. The announcement of this discovery, which adds one more to the list of glands the active agents of which have been separated in pure form, was made by the discoverer, Prof. John J. Abel of Johns Hopkins University, to the meeting at St. Louis of the Federation of American Societies for Experimental Biology. The only other pure glandular principles so far obtained by scientists are thyroxin from the thyroid gland, and adrenalin from the adrenal glands, both substances being of great use in medicine.

The impure extract of the pituitary gland is known in medicine as a powerful stimulant of the intestines and other structures containing involuntary muscles. It is a specific remedy for the disease known as diabetes insipidus, characterized by excessive activity of the kidneys but not to be confused with diabetes mellitus in which the sugar derived from food is excreted through the kidneys instead of being utilized in the system. Insulin, an extract of the pancreas discovered in 1922 by Drs. F. G. Banting and J. J. R. McLeod of Toronto, is a remedy for the latter disease.

Professor Abel has obtained pituitary extract as a highly purified salt of tartaric acid and believes it to be probably a single chemical compound which may be made synthetically in the laboratory. His preparation has already been used in several severe cases of diabetes insipidus with remarkable results and promises to be of use in hemorrhage, shock, and uterine inertia. It is 1,200 times as active as the powerful base, histamine, now used in medicine.

The substance isolated by Dr. Abel has been extracted from the posterior or nervous part of the pituitary body which lies at the base of the brain just above the roof of the mouth. The gland is in two parts. The front or anterior portion has an important influence on growth and cases of giantism or dwarfing are sometimes due to disturbances with its function. The posterior part of the gland possesses the powers exhibited by the principle which Dr. Abel has extracted from it and is also thought to have an important influence on sexual development.

READING REFERENCE - Harrow, Benjamin. Glands in Health and Disease. New York, E.P. Dutton & Co., 1922.

MAKE NEW MATERIAL FROM CORNCOBS AND WASTE OIL

Plastic materials which can be substituted for hard rubber and synthetic resins now on the market can be made from corncobs and stalks, oathulls, peanut shells, cotton linters, and a wide variety of agricultural wastes by a simple process developed in the chemical engineering laboratories at Iowa State College, under the direction of Dr. O. R. Sweeney.

Electrical insulators, radio panels, phonograph records, fountain pen barrels, automobile steering wheels and noiseless gears are only a few of the many possible uses for the new resin.

The process of manufacture is surprisingly simple. The corncobs, or other raw materials, are mixed with a crude and cheap coal tar oil, now on the market, and the mixture cooked for three hours. A gummy sticky mass results. This is dried and ground to a powder, after which it is pressed into any shape desired.

The stuff can be drilled, sawed and machined, it is stable in water, and resists high temperatures. It is smooth, takes a perfect impression and a lustrous polish. The possibility for a brand new market is opened up, both for the farmer, with his hitherto wasted materials, and for the coal tar refiners, with the almost unused fraction.

Graduate students in the department at Ames have been making souvenir sets of checkers for their friends, turning them out in large quantities. With the cost of raw materials at about four cents a pound, a tremendous supply available and a process of manufacture so simple, the future uses for the new material seem almost unlimited.

READING REFERENCE - Slosson, Edwin E. Creative Chemistry. New York, Century Company, 1920.

$1,000 PRIZE AWARDED FOR NEW MATHEMATICAL THEORY

The $1,000 prize for a notable contribution to the advancement of science presented at the recent meeting of the American Association for the Advancement of Science has been awarded to Dr. Leonard Eugene Dickson, professor of mathematics at the University of Chicago. He developed a new mathematical theory.

The jury headed by Dr. Nevin M. Fenneman of the University of Cincinnati made the award in recognition of three papers presented by Dr. Dickson to the mathematical section of the Association and the American Mathematical Society. The titles of these three papers were: "Algebras and their Arithmetics", "On the Theory of Numbers and Generalized Quaternions", and "Quadratic Fields in Which Factorization is Always Unique".

An anonymous donor, understood to be a layman of New York, offered the $1,000 prize for the first time this year, and great interest centered on the award.

Dr. Dickson has developed a far-reaching general theory of the arithmetic

of any rational algebra whose richness and simplicity mark it as the true generalization of the classical theory of algebraic numbers. Mathematicians explain that he arrived at this important step by adopting an entirely new definition. His theory is not assumed or presupposed, but it is developed far enough to explain the new generalization of it.

Many other mathematicians have attempted to develop adequate theories that accomplish what Dr. Dickson has achieved, but they have heretofore either been vacuous or lead to insurmountable difficulties.

Dr. Dickson has just published a book under the title of "Algebras and their Arithmetics". With regard to this it is declared:

"The book appeals not only to those interested in either algebra or the theory of numbers but also to those interested in a broad way in the foundations of mathematics. The modern methods of approach to mathematical subjects are illustrated very simply by the postulational treatments of algebras, arithmetics, fields, and indeterminates. Besides an introduction to matrices, there is given a generalization of the theory of equivalence of matrices whose elements are integers to matrices whose elements are integers of an algebra. The book may be read by any one acquainted with the simpler parts of a first course in the theory of equations."

READING REFERENCE - Woodruff, Lorande Loss. The Development of the Sciences. Articles on Mathematics by Prof. Ernest William Brown. New Haven and New York, Yale University Press, 1923.

Dickson, Leonard Eugene. Algebras and their Arithmetics. Chicago, University of Chicago Press, 1923.

FLAPPERS A DELICACY

From the gastronomic standpoint the fins, flippers, and flappers of many edible creatures seem to be the most highly regarded. Chicken wings have always been one of the favorite tid-bits of the epicure and researches among savage tribes given to more varied diets confirm the impression that the organs of locomotion are good eating. Among the provisions of early treaties with the Indians made by settlers along the Atlantic coast was one which reserved for the exclusive use of the aborigines all the fins and tails of whales cast ashore on the beaches, these appendages being highly valued in the savage feasts. From the former cannibal islands of the Pacific and from dark regions of the earth where cannibalism still lingers, explorers report that the human hand is esteemed the last word in dietary perfection. Hands, wings, and flippers are all of similar evolutionary origin. The similarity seems to extend beyond that of form to a resemblance in inner structure and composition which makes of them all a valued food.

The Black Sea is unique among oceans and seas of the earth in that below a depth of 600 feet its waters are stagnant and lifeless.

IMMIGRATION SELECTION ADVOCATED BY EUGENISTS

Numerical limitation and careful selection of immigrants, with a quota provision based upon the census of 1890, are advocated in the report of the Committee on Selective Immigration of the Eugenics Committee of the United States, made public by Prof. Irving Fisher, chairman of the Eugenics Committee.

"Immigration is a long-time investment in family stocks rather than a short-time investment in productive labor," is the key-note of the report. A system of consular certificates for intending immigrants, based upon inspection abroad, mental tests for all with a score more than equal to the average American intelligence as a requirement for admission, and severe restriction of the present system of bonding aliens admitted on appeal, are also advocated.

"A conviction that the census of 1890 should be used as the basis of any percentage law has been growing rapidly," the report states. "Since there were fewer southeastern Europeans here in 1890 than in 1910, this provision would decidedly cut down the number of such immigrants. Immigrants from northwestern Europe furnish us with the best material for American citizenship. They have higher living standards than other immigrants, average higher in intelligence, are better educated, more skilled, and better able to understand our form of government. A percentage limitation based on the 1890 census is sound American policy based on historical facts.

"It is not a question of racial superiority of northwestern Europeans or of racial inferiority of southeastern Europeans. It is simply a question as to which of these two groups of aliens as a whole is best fitted by tradition, political background, customs, social organization, education, and habits of thought to adjust itself to American institutions.

"Experts have told us that had mental tests been in operation, and had the 'inferior' and 'very inferior' immigrants been refused admission to the United States, over 6,000,000 aliens now living in the country, free to vote, and to become fathers and mothers of future Americans, would never have been admitted. It is high time for the American people to put a stop to such degradation of American citizenship."

The report relates the findings of Dr. H. H. Laughlin, assistant director of the Eugenics Record Office, who made a study of the "socially inadequate" groups in 445 institutions for defectives and criminals, and who reports that 44 per cent. of this institutional population was either foreign born or had one or both parents foreign born. He also states that the immigrants from northwestern Europe, on the whole, contribute far less in proportion to this defective population than do those from southeastern Europe.

"The original argument for the percentage law was economic. The fundamental reason for its continuance is biological," the report declares. Mental tests are demanded of all immigrants.

"No alien should be admitted who has not an intellectual capacity superior to the American average. Aliens should be required to attain a passing score of the median army Alpha test, or the corresponding score of other approved tests, these tests to be given in the native tongue of the immigrant. Aliens whose

family history indicates that they come of unsound stock should be debarred."

Since, according to the report, a large percentage of bonded aliens admitted on appeal have violated their bonds and remain in this country, many of them as public charges, it is urged that aliens should be admitted on appeal over the heads of the medical examiners only in very rare and exceptional cases, and in such cases, cash bonds in substantial sums should be required.

Requirements on consular certificates to be made essential to admission should include a certificate from the local police that the intending immigrant had never been convicted of crime other than a political one. Certificates are advocated on the ground of both efficiency and humanity in that they would prevent the distressing scenes when immigrants are separated from their families and turned back at the port of entry.

Members of the Committee on Selective Immigration, presenting this report, include Madison Grant, chairman; Robert DeC. Ward; Charles W. Gould, Lucien Howe, Albert Johnson, and Francis H. Kinnicutt.

ANTS LIKE HOMEBREW AND MAKE THEIR OWN

Ants consume more alcohol in proportion to their body weight than does the most accomplished "old soak", asserts Prof. Paul Lindner, chief of the fermenting industry institute in Berlin. The insects whose industry has become a proverb manufacture their own home-brew in their digestive canal by the action of yeasts on the milky juices which they extract from aphids or plant lice which they keep for that purpose,

Other insects have similar homemade home-brew outfits which they use to capacity, Dr. Lindner stated. Wasps are accomplished bootleggers. In the Balkans where a strong liquor is made from prunes which are fermented and distilled in open vessels in the orchards the vats are besieged by swarms of thirsty wasps. The queen of another species keeps her favorite yeast in storage during the winter between the tiny hairs of her tongue and deposits it in the spring on the blossoms from which the honey is taken.

MODERN MARRIAGE IN ANCIENT ASSYRIA

The modern idea of married couples having merely a calling acquaintance with one another is not so new after all. A German expedition dug up tablets in Assyria during the war which indicate that a wife lived usually with her parents rather than with her husband. But her husband was not without his rights. If she continued in her modern methods and became a sector of the famous "eternal triangle", friend husband might lawfully kill her or at least cut off her ears.

It is estimated that there are 30,000 bandits in the province of Yunnan in southwestern China.

WEEDS NOT FLOWERS CAUSE OF HAY FEVER

Hay-fever is not a defect of the strenuous American temperament, but a universal nuisance, although in older countries less abundant because of the lack of culprit weeds, according to Dr. Ivor Griffith of the Philadelphia College of Pharmacy. It may be alleviated or even cured, he stated, by the same method that the boy whom his first cigar makes deathly sick gets accustomed to tobacco, by a repetition of small doses.

Dr. Griffith said the pollens which are responsible for hay-fever are seldom those of flowers, which are sticky and relatively heavy, and which because of the sweet odor of the flowers are largely carried by bees and insects so attracted, but are those of the perfumeless and inconspicuous flowers of the weeds and grasses. Insects leave these alone and so Nature broadcasts them on every wind.

"First catch your pollen" was Dr. Griffith's first recipe for a cure. This can be done by rubbing various pollens into scratches on the sufferer's arm. The guilty weed will raise a welt. Then, alcoholic solutions of the pollen in small and increasing doses will frequently so harden the sufferer that, although formerly so sensitive as, according to Dr. Griffith, "to sneeze every time a grass widow goes by", he may walk across pasture fields in comfort.

Similar methods are used, he said, in the treatment of the even more serious and sometimes disabling asthmas due to sensitiveness to animal substances such as horse or cat dandruff, goosefeathers, or eggs.

TELLS HOW TO GROW PINK HYDRANGEAS

Gardeners, both amateur and professional, who have sometimes been dismayed to see so-called pink hydrangeas produce blue flowers, will be interested in the work of C. H. Connors of the New Jersey Agricultural Experiment Station who has found how the color of the blooms can be controlled.

It has been known, he said, that certain types of soil or certain substances such as alum, aluminum sulphate, or iron sulphate, added to the soil in the proper amounts at the proper times had the power of making the plants bloom blue; but no one knew just what would fix the pink color. It has now been found that soils of great acidity produce blue flowers and soils nearly neutral or slightly alkaline will produce pink flowers. If blue are desired, keep the soil acid.

FIND LONG-SOUGHT CLUE TO MAYAN JEWEL MYSTERY

Scientific detectives may soon solve the mystery of where the ancient Maya and Aztecs got the jade for their jewelry. It is a distinctively American mineral, tuxtlite. Theories of an Asiatic origin for the jade are upset by mineralogical evidence unearthed by Dr. H. S. Washington of the Carnegie Institution and published in a statement by the Institution at its annual exhibit in Washington.

TABLOID BOOK REVIEW

NEWELL'S PRACTICAL CHEMISTRY: By Lymen C. Newell, D.C. Heath and Com., New York, 1922, $1.92

This is a text book for use in ghigh school chemistry classes which has as one of its principal good points the incorporation of descriptions of industrial processes into the reading matter. Quite properly an attempt is also made to progress from the known to the unknown in the development of the subject. There is a danger, however, of practical chemistry becoming too practical. The definitions in this book may also be too quotable. The students may be tempted to learn them by rote and not by reason.

WILL MEASURE SUN'S HEAT FOR ARGENTINE GOVERNMENT

At La Quiaca on the northwest boundary of Argentina where at 11,000 feet above sea level the sun's rays beat down on a desert mountain region out of clear skies, the Argentine Government will soon begin measurement of variations in the sun with a view to their use in practical weather forecasting. William H. Hoover of the Astrophysical Laboratory of the Smithsonian Institution left New York January 12 for Buenos Aires to install and operate the necessary apparatus.

There are two other stations now in operation making similar measurements. One of these is the Smithsonian station on Mount Montezuma in Chile and the other is located near Wenden, Arizona, on Mount Harqua Hala.

Indications have been found at these stations that weather is influenced in some ways by variations in solar radiation. The new station will undertake experiments to determine the value of such variations for actual weather prediction. To measure accurately the changes in the amount of heat sent out by the sun, it is necessary to measure the radiation outside the atmosphere or the amount of heat which would reach the earth if there was no air on it.

To do this, the amount of sun's heat falling upon one square centimeter of the earth during the course of one minute is measured at different times of the day when the air mass is different. When the sun is overhead the absorption by the air is least and it is greatest when the sun is near the horizon. These differences are plotted in the form of a curve and from this data the amount of radiation outside the atmosphere is calculated.

TALKING WATER

Engineers at the office of the Delta Barrage in Egypt did not want to pay a man to stay at the reservoir miles away just to read the gauge. They decided to make the water report its own level by telephone. Now they just take down the receiver and the number of the gauge reading is automatically spoken to them. A float connected with a phonograph connected with the telephone does the trick.